WHAT IS CLAIMED IS:

1.   1.   A security policy database cache comprises:
2.   at least one primary table including signature values
3.   that indicate that a IPSec packet's security policy database
4.   (SPD) information may be in the cache; and
5.   at least one secondary table including cache entries
6.   having a selector, flags, security association (SA)
7.   information and an operation to perform on the corresponding
8.   packet for which a cache lookup was made.

1.   2.   The security policy database cache of claim 1
2.   wherein the at least one primary table resides in DRAM.

1.   3.   The security policy database cache of claim 1
2.   wherein the at least one secondary table resides in SDRAM.

1.   4.   The security policy database cache of claim 1
2.   wherein at least one primary table and the at least one
3.   secondary table resides in the same memory.

1.   5.   The security policy database cache of claim 1
2.   wherein the at least one primary table and the at least on
3.   secondary table resides in shared memory accessible by engines
4.   of a network processor.

1.   6.   The security policy database cache of claim 1
2.   wherein the at least one primary table is divided into a
3.   plurality of buckets and each bucket is subdivided into bins.

1.   7.   The security policy database cache of claim 1
2.   wherein the cache has a one-to-one correlation between the at

3   least one primary table location and the at least one

4   secondary table.

1   8.   The security policy database cache of claim 1

2   wherein the signature index for the first primary table is

3   produced using an IP selector and either a hardware hash unit

4   or a software hashing algorithm.

1   9.   The security policy database cache of claim 8

2   wherein the IP selector can be either IPv4 or IPv6 and

3   includes IP destination, IP source, IP protocol, IP source

4   port, IP destination port.

1   10.   The security policy database cache of claim 10

2   wherein when the at least one primary table is searched for a

3   matching signature to a packet, and if no matching signature

4   is found, the at least one secondary table is not accessed.

1   11.   The security policy database cache of claim 10

2   wherein when the at least one primary table is searched for a

3   matching signature to a packet, and a matching signature is

4   found, the at least one secondary table is accessed.

1   12.   The security policy database cache of claim 11

2   wherein if the selector match is successful flags and SA

3   information are returned to a requesting device.

1   13.   The security policy database cache of claim 1

2   wherein the at least one primary table is a first one of a

3   plurality of primary tables and the at least one secondary

4   table is a first one of a plurality of secondary tables.

1   14. The security policy database cache of claim 13
2 wherein when one of the plurality of primary tables is
3 searched for a matching signature to a packet, and if no
4 matching signature is found, the secondary table for the one
5 of the plurality of primary tables is not accessed.

1   15. The security policy database cache of claim 14
2 wherein when one of the plurality of primary tables is
3 searched for a matching signature to a packet, and a matching
4 signature is found, the secondary table for the one of the
5 plurality of primary tables is read and a selector is compared
6 with the selector from the packet.

1   16. The security policy database cache of claim 14
2 wherein if the selector match is successful flags and security
3 association (SA) information are returned to a requesting
4 device.

1   17. A method comprises:
2   producing a signature of a packet and at least first and
3 second indexes into corresponding first and second primary
4 tables of a security database cache;
5   reading contents of a bucket from a first one of the
6 primary tables and a bucket from a second one of the primary
7 tables to determine whether either of the buckets have
8 contents that match to the produced signature; and for a
9 match,
10   determining if a selector in an entry in a secondary
11 table matches a selector of the packet; and if a match
12   processing according to an operation indicated by the
13 entry.

1   18.   The method of claim 17 wherein processing comprises,
2   processing the packet by reading flags for the packet entry to
3   process the packet according to the flags.

1   19.   The method of claim 17 wherein the cache uses the IP
2   packet selector from a packet and hashing algorithm to produce
3   the signature.

1   20.   The method of claim 17 wherein the actions taken
2   with the packet depend on the value of the flags and include
3   dropping the packet if the flags indicate drop, bypass, and
4   enter a secure network.

1   21.   The method of claim 17 wherein the packets are
2   incoming packets.

1   22.   The method of claim 17 wherein the packets are
2   outgoing packets.

1   23.   The method of claim 17 wherein an entry is added to
2   the security policy database cache.

1   24.   The method of claim 17 wherein if the signatures are
2   exhausted, the method further comprises:
3   searching a security policy database to locate the proper
4   operation for the packet and to locate the correct security
5   associations (Sas) to apply to the packet; and
6   inserting the located correct SA as a cache entry into a
7   SPD cache.

1   25.   The method of claim 17 wherein packet processing
2   determines if the signature equals zero, and if zero, the

3   packet processing sets the signature to another, non-zero

4   value.

1   26.   The method of claim 17 wherein the packet processing

2   repeats until either all the matching signatures are exhausted

3   or a secondary table match is found.

1   27.   A computer program product residing on a computer

2   readable medium for processing a packet comprises instructions

3   to cause at least one processor to:

4   produce a signature of a packet and first and second

5   indexes into corresponding first and second primary tables of

6   a security database cache;

7   read contents of a bucket from a first one of the primary

8   tables and a bucket from a second one of the primary tables to

9   determine whether either of the buckets have contents that

10   match to the produced signature; and for a match,

11   process according to an operation indicated by the entry.

1   28.   The computer program product of claim 27 wherein

2   processing comprises, processing the packet by reading flags

3   for the packet entry to process the packet according to the

4   flags.

1   29.   The computer program product of claim 27 wherein the

2   cache uses the IP packet selector from a packet and hashing to

3   produce the signature.

1   30.   The computer program product of claim 27 wherein the

2   actions taken with the packet depend on the value of the flags

3   and include dropping the packet if the flags indicate drop,

4   bypass, and enter a secure network.

1   31.   The computer program product of claim 27 wherein the

2 packets are incoming packets.

1   32.   The computer program product of claim 27 wherein the

2 packets are outgoing packets.

1   33.   The computer program product of claim 27 wherein an

2 entry is added to the security policy database cache.

1   34.   The computer program product of claim 27 wherein if

2 all of the signatures are exhausted, the computer program

3 product of claim 27 further comprises instructions to:

4   searching a security policy database to locate the proper

5 operation for the packet and to locate the correct security

6 associations (Sas) to apply to the inbound IPsec packet; and

7   inserting the located correct SA as a cache entry into a

8 SPD cache.

1   35.   The computer program product of claim 27 wherein

2 packet processing determines if the signature equals zero, and

3 if zero, the packet processing sets the signature to another,

4 non-zero value.

1   36.   The computer program product of claim 27 wherein the

2 packet processing repeats until either all the matching

3 signatures are exhausted or a secondary table match is found.

1   37.   A network forwarding device comprising:

2   at least one physical interface;

3   a framer;

4   a network processor;

5   security policy database cache to provide data to the

6   network processor when processing packets, the security policy

7   database including:

8   at least one primary table including signature

9   values that indicate that a packet's SPD information may

10   be in the cache; and

11   at least one secondary table including cache entries

12   having a selector, flags, SA information and an operation

13   to perform on the corresponding packet for which a cache

14   lookup was made; and

15   a switch fabric.

1   38.   The device of claim 37 wherein the interface is a

2   media access controller device.

1   39.   The device of claim 37 further comprising SDRAM

2   storing the at least one secondary table.

1   40.   The device of claim 37 further comprising SRAM

2   storing the at least one primary table.

1   41.   The device of claim 37 further comprising local

2   memory to store the at least one primary table.

1   42.   The device of claim 37 further comprising scratchpad

2   memory to store the at least one primary table.